

## **Can camouflage keep up with climate change? Connecting down-scaled climate models to adaptation for a key forest species**

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**Summary:** Few existing high resolution climate models have yet specifically connected ecologically relevant downscaled climate drivers to on-the-ground responses for wildlife species. This project will link downscaled, high-resolution climate models and the consequences of specific climate drivers on species and ecosystem-level adaptation of snowshoe hares, a high-profile prey of the Federally Threatened Canada Lynx and other forest carnivores. Like many other species in temperate ecosystems (e.g. arctic foxes, weasels, ptarmigan), hares undergo a seasonal coat color molt to match the presence or absence of snow. Because a reduced duration of snowpack is the strongest signal of climate change in temperate regions, and because coat color mismatch (white coat on non-snowy background) is likely to lead to high predation-induced mortality, the climate factors that make the hare vulnerable to rapid decline are starkly clear. On the other hand, any species may respond to climate change by adapting or moving. This project will provide wildlife managers with the first case study to connect field measurements of responses (adapt, move, or decline) to downscaled climate maps at ecologically relevant scales. Scientists will use radio-tracking studies to determine the demographic cost of mismatch of snowshoe hares to their background, and to evaluate the scope for movement or adaptive responses whereby timing of coat color shifts are modified or behaviors mitigate negative effects of mismatch. In addition, they will specifically connect the responses of hares to high resolution climate models of snowpack and temperature that can be projected for the next 30-50+ years.